



Quality Control/Assurance by Variable

Ana Lara-Lopez

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Review of all IMOS QA/QC by variable

- Current status of QA/QC across IMOS observed variables
- Highlight gaps
- Identify priorities
- Is it effective and efficient?
- What can we do to improve?

IMOS observes 30 variables,
27 consistent with GOOS, 7 we are not observing

GOOS Panel EOVs (11+8+8 = 27)	IMOS EOVs (30)
Physics Panel/OOPC	
1. Sea surface temperature (SST)	1. Temperature- surface
2. Sea surface salinity (SSS)	<i>(gap just starting to be addressed)</i>
3. Sea surface height	2. Sea Surface Height <i>(tide gauge network sits outside IMOS)</i>
4. Sea state	3. Surface waves – amplitude 4. Surface waves – spectrum
5. Sea ice	<i>(identified gap)</i>
6. Surface currents	5. Velocity
7. Ocean surface vector stress	6. Wind parameters (velocity and stress)
8. Heat flux/radiation	7. Air-sea fluxes
9. Subsurface temperature	8. Temperature- Subsurface
10. Subsurface salinity	9. Salinity
11. Subsurface currents	(Velocity – see above)
	10. Waves – internal

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BGC Panel/IOCCP	
1. Dissolved Oxygen	11. Oxygen
2. Inorganic macro nutrients	12. Macronutrient concentration
3. Carbonate System DIC, Total Alkalinity, pCO ₂ , pH (at least 2 of 4)	13. pCO ₂ 14. pH 15. Total. Inorg. Carbon 16. Alkalinity
4. Transient tracers	
5. Suspended particulates	17. Total Suspended Solids
6. Nitrous oxide	
7. Carbon isotope	
8. Dissolved organic carbon	18. CDOM and Backscatter

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Biology & Ecosystems Panel	
1. Phytoplankton biomass and diversity	19. Chlorophyll a concentration 20. Phytoplankton species 21. Phytoplankton Biomass
2. Zooplankton biomass and diversity	22. Zooplankton Species 23. Zooplankton Biomass
3. Marine turtles, birds, mammals abundance and distribution	24. Top Predators species 25. Top predators – population
4. Live coral cover	<i>(AIMS Long Term Monitoring Program)</i>
5. Seagrass cover	26. Benthos (% coverage of species)
7. Macroalgal canopy	<i>(Benthos see above)</i>
6. Mangrove cover	<i>(not currently in scope for IMOS)</i>
7. Fish abundance and distribution	27. Nekton Species 28. Nekton Biomass
	29. Detritus (flux)
	30. Primary Productivity

- IMOS variables observed/estimated by 26 different platforms and technologies (Facilities)
- Many variables are measured by multiple Facilities (up to 18 for temperature)
- Others measured by only one (e.g. nekton biomass)
- Virtually all Facilities measure multiple variables (up to 17 at National Reference Stations)
- Because of the way in which IMOS was developed, QC is largely done by Facility.

- Document of current QA/QC procedures by variable (i.e. cross-Facility)
- Taking into account:
 - type of platform (mobile vs fixed)
 - spatial coverage (surface, single point, through water column)
 - International links for QC
 - Documentation of QA/QC protocols

The review is for the level of QA/QC applied to the data by the facilities before being delivered to the AODN

Key Points

- QA/QC across IMOS facilities per variable is inconsistent.
- Use of different QF for same variable by different facilities
- Lack of a written document outlining QA/QC protocols in some facilities
- Calibration of sensors is inconsistent, with similar sensors sent to different places for their calibration.
- For some facilities (e.g. gliders) manual QC is lost when data is re-processed
- Some EOVs can only be obtained by analysing data (passive and active acoustics)
- Data from additional sensors added in some facilities (e.g. SOTS velocity and acoustic data) has not reached AODN

Key Points

- Some near real time (NRT) data is not QC'd and some variables have little to no QC (waves)
- QC for some facilities (biologging) is outsourced to partner organisations
- Visual validation done of the automated/semi-automated QC from the Matlab toolbox needs improvement
- New QA/QC procedures have been developed or are being developed by some facilities Acoustic tracking, Autonomous Underwater Vehicle imagery, Radar
- Centralisation for the QA/QC of some variables has worked well, ensuring all data are treated the same

Draft recommendations for discussion

- Facilities without a written protocol produce one that includes the QA/QC procedures for all variables derived from this facility.
- Centralisation of QA/QC for some variables should be considered
- Publication of the data in a peer review journal (such as the phytoplankton database) is good practice and should be encourage.
- Implementing and developing a set of standard automated test similar to QARTOD for near real-time QC could be a good approach

Draft recommendations for discussion

- Make calibration results from sensors available through the AODN website and adding uncertainty flags to the data
- Updating the document “IMOS Data Streams and their Uncertainties” will be a very valuable exercise.
- Define a more rigorous process to get users feedback, which will help improve our systems
- A written report of results from some Task Teams (TT) such as the O2, radiometry and acoustic tracking TT’s are essential and expected.

Next steps

Document current status

Key points emerged

Draft recommendations for disc. here and beyond

It will take time, so prioritisation is important

NRS discussion, lunch time 15/2

Here we are talking about the physical measurements:

1. Long time series

- Maria Island there for 70 years
- What about
 - Port Hacking, Rottnest?
 - Yongala, Darwin, KI, NSI?

2. Does expert QC by UNSW + AIMS + SARDI + CSIRO
= expert QC for all IMOS data?

3. Access to files

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